Letters to the Editor

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GONIOMETRIC STUDY OF TERBIUM SULPHATE OCTAHYDRATE

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Single crystal of $Tb_2(So_4)_38H_2O$ were crystallised from aqueous solution of the rare earth salts in triple distilled water by slow evaporation at room temperature. The salt was prepared from the spectroscopic pure variety of oxide of terbium supplied by Johnson and Matthie Co. Ltd. (London). Well formed crystals were sorted out and tested under a polarising microscope for checking any probable twining.

A two circle goniometer used for the measurements of the interfacial angles of the crystals was modified to give better and clear reflections even from striated surface of the crystals and thus the labour of selecting crystals with extremely good faces from a large number for goniometric purpose, was avoided. This was achieved by introducing a new form of cross-wire "A CROSSED FILAMENT BULB" in place of non-luminous cross-wire in the collimator. The image of this crossed-filament formed at the telescope after reflection from the crystal surface was bright on a dark background (while the image of non-luminous cross was dark) and so could be seen and located much more prisely and easily.

The forms represented by the crystal are orthopinacoids {100} and basalpinacoids {001}, {10$\bar{1}$} and {11$\bar{1}$}. The normal crystallographic angles taking symmetry considerations and good reflections are given in Table I. The notations for faces are according to Groth (1908)

The faces a(100) and c(001) were chosen following Groth (1908) in case of $Er_2(So_4)_3 \cdot 8H_2O$, and Kashyap (1963) in case of $Dy_2(So_4)_3 \cdot 8H_2O$. A stereogram was drawn to check the symmetry of crystal.

TABLE I

No.	Angles between faces	Measured angles	Calculated angles
1.	a(100):c(001)	61°42′	—
2.	c(001):p(101)	40°34′	—
3.	$p(10\bar{1}):w(11\bar{1})$	63°2′	—
4.	a(100):r(101)	—	37°41′
5.	$a(100):w(11\bar{1})$	84°36′	84°28′
6.	a(100):q(011)	—	76°31′
7.	c(001):q(011)	—	60°33′

The interfacial angles were calculated by methods as given by Tutton (1922). These are included in Table 1.

From these values we get

Axial Angle : $\beta = 180° - a(100) : c(001) = 180° - 6142' = 118°18'$

Axial Ratios :

$$\frac{c}{a} = \frac{\sin c(001):r(101)}{\sin a(100):r(10\bar{1})} = \frac{\sin 24\ 1'}{\sin 37\ 41'} = 0{\cdot}66577$$

$$\frac{c}{b} = \frac{\tan c(001):q(011)}{\sin \beta} = \frac{\tan 60\ 33'}{\sin 118\ 18'} = 2.0115$$

$$\frac{a}{b} = \frac{a}{c} \times \frac{c}{b} = \frac{2{\cdot}0115}{0.66577} = 3.0213$$

$$a : b : c = 3.0213 : 1 : 2.0115$$

It is seen that these ratios of $a : b : c$ and the value of β agree well with other octahydrated isomorphous sulphate crystals such as of Pr, Nd, Er and Gd (Groth, 1908) and Dy (Kashyap, 1963).

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